

CLAIMS:

1. A transmitter in an apparatus for monitoring a condition of a tire of a vehicle, wherein the transmitter is provided in the tire, the transmitter comprising:

a measuring device for measuring a condition of the tire;

a transmission circuit, wherein the transmission circuit generates a transmission signal containing data that represents the measured tire condition;

a valve stem, wherein the tire is filled with air through the valve stem, and wherein the valve stem has a magnetic piece;

a magnetizing member for magnetizing the magnetic piece, wherein the position of the magnetizing member relative to the magnetic piece can be changed, and wherein a magnetized state of the magnetic piece varies according to the position of the magnetizing member relative to the magnetic piece; and

a magnetized state detecting device for detecting the magnetized state of the magnetic piece, wherein the transmission signal contains data based on the detected magnetized state in addition to the tire condition data.

2. The transmitter according to claim 1, wherein the tire is one of a plurality of tires of the vehicle, wherein the transmitter is one of a plurality of transmitters each of which is provided in one of the tires, wherein each transmitter includes a controller, and wherein, based on the magnetized state detected by the corresponding magnetized state detecting device, each controller determines the position of the tire in which the associated transmitter is provided.

3. The transmitter according to claim 2, wherein the transmission signal of each transmitter contains data

representing the position of the corresponding tire.

4. The transmitter according to claim 1, wherein the magnetic piece is one a plurality of magnetic pieces that are arranged at predetermined intervals along a circumferential direction of the valve stem.

5. The transmitter according to claim 4, wherein the magnetic pieces include a first magnetic piece and a second magnetic piece, and wherein the position of the magnetizing member can be changed relative to the first magnetic piece and the second magnetic piece such that one of the following magnetized states is selected, the magnetized states including: a state where the first and second magnetic pieces are both magnetized; a state where only the first magnetic piece is magnetized; a state where only the second magnetic piece is magnetized; and a state where the first and second magnetic pieces are not magnetized.

6. The transmitter according to claim 1, wherein the magnetizing member is detachably attached to the valve stem.

7. The transmitter according to claim 1, wherein the magnetizing member is a magnetic ring, the magnetic ring being attached to the valve stem such that the magnetic ring can be rotated about an axis of the valve stem, and wherein the magnetic ring includes at least one permanent magnet located at a section of a circumferential direction of the magnetic ring.

8. The transmitter according to claim 7, wherein the valve stem includes a threaded portion on an outer circumferential surface, where a nut is threaded to the threaded portion, and wherein the nut fixes a circumferential position of the magnetic ring relative to the valve stem.

9. An apparatus for monitoring conditions of a plurality of tires of a vehicle, the apparatus comprising:

a plurality of transmitters each provided in one of the
5 tires, wherein each transmitter includes:

a measuring device for measuring a condition of the corresponding tire;

a transmission circuit, wherein the transmission circuit generates a transmission signal containing data that
10 represents the measured tire condition;

a valve stem, wherein the tire is filled with air through the valve stem, and wherein the valve stem has a magnetic piece;

a magnetizing member for magnetizing the magnetic piece,
15 wherein the position of the magnetizing member relative to the magnetic piece can be changed, and wherein a magnetized state of the magnetic piece varies according to the position of the magnetizing member relative to the magnetic piece; and

20 a magnetized state detecting device for detecting the magnetized state of the magnetic piece, wherein the transmission signal contains data based on the detected magnetized state in addition to the tire condition data, and

25 a receiver for receiving the transmission signals that are wirelessly transmitted by the transmitters, wherein, when receiving the transmission signal from any one of the transmitters, the receiver determines the position of the tire in which the transmitter that has transmitted the signal is
30 provided based on the received transmission signal.

10. The apparatus according to claim 9, wherein the magnetic piece is one a plurality of magnetic pieces that are arranged at predetermined intervals along an circumferential
35 direction of the valve stem.

11. The apparatus according to claim 10, wherein the magnetic pieces include a first magnetic piece and a second magnetic piece, and wherein the position of the magnetizing member can be changed relative to the first magnetic piece and the second magnetic piece such that one of the following magnetized states is selected, the magnetized states including: a state where the first and second magnetic pieces are both magnetized; a state where only the first magnetic piece is magnetized; a state where only the second magnetic piece is magnetized; and a state where the first and second magnetic pieces are not magnetized.

12. The apparatus according to claim 9, wherein the magnetizing member is detachably attached to the valve stem.

~~13. The apparatus according to claim 9, wherein the~~
magnetizing member is a magnetic ring, the magnetic ring being attached to the valve stem such that the magnetic ring can be rotated about an axis of the valve stem, and wherein the magnetic ring includes at least one permanent magnet located at a section of a circumferential direction of the magnetic ring.

14. The apparatus according to claim 13, wherein the valve stem includes a threaded portion on an outer circumferential surface, where a nut is threaded to the threaded portion, and wherein the nut fixes a circumferential position of the magnetic ring relative to the valve stem.